

EFFECTS OF ORTHODONTIC MINI-IMPLANT DIAMETER ON MICRODAMAGE

Enrique Cruz, Sean Liu, Jun Sun, Steven B. Blanchard, Armando Soto, Kelton T Stewart, Matthew R. Allen (Sean Liu), Department of Orthodontics and Dentofacial Genetics, Indiana University School of Dentistry, Indiana University–Purdue University Indianapolis, Indianapolis, Indiana 46202

Microdamage reduces bone mechanical properties and thus could possibly contribute to implant failure. The objective of this study was to investigate whether the diameter of mini-implants (MI) affects microdamage generation and whether this differs between the mandible and maxilla due to their contrasting cortical thicknesses. **Methods:** Maxillary and mandibular quadrants of 5 dogs were randomly assigned to receive, in situ, no intervention (control), pilot drilling only, or pilot drilling plus one of three diameters of MI: 1.4 (n=18), 1.6 (n=18), and 2.0 mm (n=18). Microdamage was assessed on basic fuchsin stained sections using epifluorescence microscopy. **Results:** No microdamage was found in the non-drilling controls. Pilot drilling produced only minimal microdamage in the maxilla but more microdamage in the mandible. There was significantly higher microdamage generated in the mandible, compared to the maxilla ($p < 0.05$). In the maxilla, although insertion of all implants produced higher microdamage than the control and pilot drilling, there were no differences between the 3 MI diameters. In the mandible, insertion of implants generated significantly higher microdamage than the control, but it did not produce higher microdamage than pilot drilling. Similarly, no differences in microdamage were found between 3 MI diameters. **Conclusion:** Insertion of MIs in the mandible produced higher microdamage than in the maxilla, which may explain that the higher MI failure rate in the mandible. Implant diameter did not affect overall microdamage burden in either jaw. Microdamage was mostly generated by pilot drilling through the cortex in the mandible, while microdamage in the maxilla was mainly produced when manual inserting MIs after pilot drilling.